SPECIFICATION

ROBOT TOY AND DRIVE DEVICE FOR TOY

Field of The Invention

The present invention relates to a robot toy and a drive device for a toy.

Background Art

As a robot toy, for example, there is known a horse robot toy. This robot toy is configured to walk on four legs (Tokukaisyo-61-125368 (FIG. 2)).

However, the conventional horse robot toy (Tokukaisyo-61-125368) only walks when flipping a switch, so there is a problem that a form change and a movement change are monotonous.

The present invention is accomplished in view of the above problem, and an object of the present invention is to provide a robot toy having various form changes and operation changes, and a drive device for a toy.

Disclosure of The Invention

In accordance with the first aspect of the present invention, the robot toy according to the present invention, comprises:

a control unit formed by a portion of a body,

wherein a form is changed by controlling the control unit, and a different movement is performed before and after the form change. Examples of the "operation" include a light emitting operation, a walking movement, a sound production operation, mouth opening and closing movements and the like.

According to this robot toy, by controlling a part (control unit) of the body, the form of the robot toy changes and the operation can be changed.

Preferably, in the robot toy, a leg forms the control unit, and a standing posture and a forward bent posture are taken according to a control by the control unit.

According to this robot toy, the operation can be changed depending upon the case of standing posture or the case of forward bent posture.

Preferably, in the robot toy, one toy component is arranged on a link facing a frame in a four-section link, the other toy component is arranged on one of swinging links facing each other, the one of the swinging links extending to an opposite side with respect to the frame and a tip thereof rotatably and swingably engaging with a rotating disk at an eccentric position, and both toy components are rotated and perform opening and closing

movements with each other by rotating the rotating disk, before or after the form change.

According to this robot toy, both toy components open and close while rotating before or after the form change.

Preferably, in the robot toy, the frame is arranged in a trunk portion, the one toy component is a lower jaw, and the other toy component is an upper jaw.

According to this robot toy, the jaw opens and closes while rotating before or after the form change.

In accordance with the second aspect of the present invention, in the robot toy according to the present invention, one toy component is arranged on a link facing a frame in a four-section link, the other toy component is arranged on one of swinging links facing each other, the one of the swinging links extending to an opposite side with respect to the frame and a tip thereof rotatably and swingably engaging at an eccentric position of a rotating disk, and both toy components are rotated and perform open and close movements with each other by rotating the rotating disk, before or after the form change.

According to this drive device for a toy, the both components for the toy open and close while rotating.

Brief Description of The Drawings

FIG. 1 is a perspective view showing a dinosaur shaped toy in standing posture in which a drive mechanism of a toy according to the present invention is applied;

FIG. 2 is a perspective view showing the dinosaur shaped toy in walking posture in which the drive mechanism of the toy according to the present invention is applied;

FIG. 3 is a perspective view showing a dismounted main portion in which the drive mechanism of the present invention is applied in the toy shown in FIGS. 1 and 2;

FIG. 4 is a perspective view showing an assembled state of the main portion shown in FIG. 3;

FIG. 5 is a structural view to explain a movement of the main portion shown in FIG. 3;

FIG. 6 is a perspective view showing an assembling structure of a leg of the dinosaur shaped toy in FIG. 1;

FIG. 7 is a view showing a method to operate a clutch incorporated in the dinosaur shaped toy in FIG. 1;

FIG. 8 is a perspective view showing a frame and a disk of the dinosaur shaped toy in FIG. 1;

FIG. 9 is a view showing a method to operate a leaf switch incorporated in the dinosaur shaped toy in FIG. 1; and

FIG. 10 is a block diagram showing an electric

system of the dinosaur shaped toy in FIG. 1.

Best Mode for Carrying Out the Invention

FIGS. 1 and 2 show a dinosaur shaped toy as one example of a robot toy according to the present invention, wherein FIG. 1 shows a standing posture thereof, and FIG. 2 shows a forward bent posture thereof.

The dinosaur shaped toy, as shown in FIGS. 1 and 2, comprises a trunk 1, a neck 2, an upper jaw 3, a lower jaw 4, a tail 5, legs 6, 6, hands 7, 7, and the like. An operation of hind legs of the dinosaur shaped toy can realize the standing posture shown in FIG. 1 and the forward bent posture in shown FIG. 2.

As shown in FIG. 3, a motor 11 and a not shown battery are contained in a box 10 forming a main portion of the trunk 1 of the dinosaur shaped toy, and a motor power is adapted to be transmitted to a disk 12 through a gear mechanism or a clutch. FIG. 5 shows an example of a portion of gears forming the gear mechanism and the clutch. In FIG. 7, the reference numeral 11a denotes a surface clutch, and clutch pieces of the surface clutch 11a gear each other when a pawl member 53 on the left side of the box 10 is moved forward, thereby transmitting the motor power to the disk 12. As shown in FIG. 6, the forward operation of the pawl member 53 is performed such that when a disk part 60 used to assemble the leg 6

rotates with the forward rotating operation of the leg 6 (for making the dinosaur shape toy be in the forward bent posture), the disk part 60 presses a switch cover 61 forward. The backward operation of the pawl member 53 is performed such that when the disk part 60 rotates with the backward rotating operation of the leg 6 (for making the dinosaur shaped toy be in the standing posture), the disk part 60 is separated from the switch cover 61 to make a biasing force from a spring 62 in FIG. 7 act thereon.

There is provided a frame 13 ahead of the disk 12 to be rotatable around a shaft 14 as a center.

Two shafts 15 and 16 are provided on the frame 13 in a direction perpendicular to the shaft 14. A link plate 17 and a cylindrical link 18 extend forward from these shafts, respectively. There are two projections 19, 19 on each side surface of the link plate 17. As shown in FIG. 8, a rod 19a is fixed to the rear portion of the link plate 17, and the rear end of the rod 19a is formed to have a spherical shape. The spherical body 19b engages a semispherical recess 12a formed on the eccentric position of the disk 12. Thus, when the disk 12 rotates, the frame swings from side to side around the shaft 14 as a center, and in the meantime, the link plate 17 moves up and down around the shaft 15 as a center. A bearing 20 is formed at the tip of the cylindrical link

18. The link 18 is formed to have a cylindrical shape so that the length of the link 18 can be changed (for example, to compensate for the effect of dimensional error in manufacturing). In the embodiment, the piston portion of the cylinder is biased by a spring in one direction (in a projecting direction or an immersion direction). The link 18 may not be a cylindrical shape, and an extendable spring may be used as the link 18.

As shown in FIG. 3, the neck 2 is divided into right and left to comprise two neck parts 21, 21. Recess portions 22, 22 are formed on each neck part to correspond to the projections 19, 19 of the link plate 17. The recess portions 22, 22 fit into the projections 19, 19 of the link plate 17 so that the neck parts 21, 21 engage with each other at an appropriate position to be assembled as shown in FIG. 4.

There are formed a bearing 23 and a long hole 24 to surround the bearing at the tip of each neck part 21, 21.

The upper jaw 3, as shown in FIG. 3, is also divided into right and left to comprise two upper jaw parts 25, 25. A shaft 26 to be inserted into the bearing 23 and a pin 27 to be inserted into the long hole 24 are formed on each upper jaw part 25.

The shafts 26, 26 are inserted into the bearings of the neck parts 21, 21, respectively, and the pins 27, 27 are inserted into the long holes 24, 24, respectively, so

that the upper jaw parts 25, 25 engage with each other at an appropriate position to be assembled as shown in FIG. 4.

Bearings 28, 28 are formed on the lateral surface of the upper jaw parts 25, 25, respectively, and holes 29, 29 are formed at positions corresponding to eyes on the upper jaw parts 25, 25, respectively.

The lower jaw 4, as shown in FIG. 3, comprises a shell part 30 forming a shell, an inner part 31 forming a gear or the like, and a tongue part 32.

There are formed four recess portions 33 on the inner surface of the shell part 30. Arms 34, 34 are formed on both sides of the rear portion of the shell part 30. Pins 35, 35 project inward at the tips of the arms 34, 34. Projections 36 are formed at positions of the inner part 31 corresponding to the recess portions 33, and a back portion 37 forming a rear portion of the lower jaw 4 is formed at the rear portion of the inner part 31. Further, a pin 38 is formed at the tip of the back portion 37, and a groove 39 is formed on the base portion of the back portion 37. A shaft 40 to be inserted into the inner part 31 and a piece 41 further extending backward are formed at the tongue part 32.

The projections 36 of the inner part 31 are inserted into the recess portions 33 of the shell part 30 to combine the inner part 31 with the shell part 30, and

the shaft 40 of the tongue part 32 is inserted into the groove 39 of the inner part 31, so that the lower jaw 4 is assembled as shown in FIG. 4.

The pins 35, 35 are inserted into the bearings 28, 28 of the upper jaw parts 25, 25, so that the lower jaw 4 is rotatably attached to the upper jaw 3.

As shown in FIG. 9, there is also provided the pawl member 53 on the right side of the box 10. The forward operation of the pawl member 53 is performed in the same way as the pawl member 53 on the left side, that is, when the disk part 60 rotates with the forward rotating operation of the leg 6 (for making the dinosaur shaped toy be in the forward bent posture), the disk part 60 presses the switch cover 61 forward. The backward operation of the pawl member 53 is performed such that when the disk part 60 rotates with the backward rotating operation of the leg 6 (for making the dinosaur shaped toy be in the standing posture), the disk part 60 separates from the switch cover 61 to make the biasing force from a spring 63 shown in FIG. 9 acts thereon. When the pawl member 53 is moved forward, a leaf switch 54 of normal open type is ON.

Next, an explanation of an electric system of the dinosaur shaped toy will be made based on the block diagram shown in FIG. 10. A storage unit 70 stores an operation program. A processing unit 71 controls such

that the number of revolutions of the motor 11 and the luminescent color of two-color diode (not shown) embedded in the eyes are different depending upon "OFF" or "ON" of the leaf switch 54.

Next, an explanation of the movements of the neck 2, the upper jaw 3, and the lower jaw 4 of the dinosaur shaped toy constituted as above will be made based on the structural view shown in FIG. 5.

In the above dinosaur shaped toy, a four-section link is formed with the frame 13, the link plate 17, the cylindrical link 18, and the back portion 37 of the lower jaw 4. The link plate 17 (neck 2) extends in a direction of the motor 10, and the tip thereof is coupled to the eccentric position of the disk 12.

That is, in the dinosaur shaped toy, the four-section link is formed with the trunk 1 comprising the frame 13, the neck 2 and the upper jaw 3 comprising the link plate 17, and the lower jaw 4 comprising the back portion 37.

When the disk 12 is rotated by the motor 10, the neck 2, the upper jaw 3, and the lower jaw 4 rotate around the shaft 15 and the shaft 16 of the frame 13 arranged on the trunk 1 as a center. As shown in the solid line, the upper jaw 3 and the lower jaw 4 open at the top dead point, and the upper jaw 3 and the lower jaw 4 close at the bottom dead point as shown in the double

line.

The explanation was made for the basic mechanism of the dinosaur shaped toy above, however, in the above dinosaur shape toy, the shaft 26 of each upper jaw part 25 is inserted into the bearing 23 of each neck part 21, and the shaft 27 of each upper jaw part 25 is inserted into the long hole 24 of each neck part 21, thereby engaging the upper jaw 3 with the neck 2. Accordingly, the upper jaw 3 can be inclined in an up and down direction within the range of the long hole 24 to the neck 2.

Moreover, in the above dinosaur shaped toy, the tongue part 32 fits into the groove 39 of the inner part 31 of the lower jaw 4 to be held rotatably, and the piece 41 of the tongue part 32 contacts the neck 2. Accordingly, when the angle of the neck 2 to the lower jaw 4 changes, the tongue part 32 rotates in an up and down direction. That is, in this dinosaur shaped toy, when the lower jaw 4 is in the opened state, the tongue part can be positioned to be apart from the shell part 30.

Further, in the above dinosaur shaped toy, a transparent box 42 having a built-in lamp such as an LED or the like is arranged on the upper jaw 3 to face the holes 29.

Moreover, in the dinosaur shape toy, crank shafts 50, 50 are arranged on both side surfaces of the box 10.

These crank shafts 50, 50 are positioned with a phase of 180 degrees. The legs 6, 6 are arranged on the both side surfaces of the box 10 to be capable of moving backward and forward. The legs 6, 6 engage the crank shafts 50, 50, respectively, so that the backward movement and the forward movement are alternately performed with the rotation of the crank shafts 50, 50.

Moreover, in the dinosaur shaped toy, the tail 5 is attached to the rear surface of the box 10 to be swingable from side to side. Not shown pieces are slidably arranged on guides 51 formed on both side surfaces of the box 10, respectively. One end of each piece contacts the crank shaft 50, and the other end thereof contacts the tail 5. Thus, when the crank shafts 50, 50 move, these pieces also move, so that the tail 5 can be moved from side to side.

Moreover, in the dinosaur shaped toy, a main switch 52 is arranged on the upper surface of the box 10, the pawl member 53 to drive the motor 11 is arranged on one side surface of the box 10, a sub switch (not shown) to blink a lamp such as an LED of the box 42 (for example, two-color light emitting diode) is arranged on the other side surface of the box 10. When the main switch 52 is ON, the crank shafts 50 move, and the lamp such as an LED of the box 42 lights up with green. When the pawl member 53 is moved to the side of ON, the neck 2, the upper jaw

3, and the lower jaw 4 move, and the color of the lamp changes from green to red.

Moreover, in the above embodiment, the disk 12 is rotated directly by the motor 11, however, the configuration may be such that a motor to rotate the crank shafts 50 is connected to the shaft of the disk 12 through a clutch or the like, and the clutch is connected by the above sub pawl member 53 to rotate the disk 12. In this case, the movement of the head including the neck 2, the upper jaw 3, and the lower jaw 4, the movement of the legs 6, 6, the movement of the tail 5, and further the movement of the hands 7, 7 can be performed by one motor.

In the above embodiment, the explanation was made of the example in which the drive mechanism of the present invention is applied to the dinosaur shaped toy, however, it is to be understood that the drive mechanism of the present invention can also be applied to other animal toys, doll toys or the like.

Industrial Application

Explaining the typical effect of the present invention, a portion of the body forms the control unit, and when the control unit is controlled, the form changes and the movement which is different before and after the form change is performed. Thus, the robot toy which has

various form changes and movement changes with high amusement can be realized.